IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Gordon G. Guay	Art Unit	: 1745
Serial No.	: 10/664,818	Examiner	: Tony Sheng Hsiang Chuo
Filed	: September 16, 2003	Conf. No.	: 3443
Title	: ENHANCED FUEL DELIVERY FOR DIRECT METHANOL FUEL CELLS		

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APPEAL BRIEF ON BEHALF OF GORDON G. GUAY

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(1) Real Party in Interest

The real party in interest in the above application is Proctor & Gamble, Inc. .

(2) Related Appeals and Interferences

Appellant is not aware of any appeals or interferences related to the above-identified patent application.

(3) Status of Claims

This is an appeal from the decision of the Primary Examiner in a final office action dated November 15, 2007, finally rejecting claims 1-26, all of the claims in the application.

Appellant filed a Notice of Appeal on **April 22, 2008**. Claims 1-26 are the subject of this Appeal.

(4) Status of Amendments

Appellant filed a Reply to the Final Office Action. In the advisory action, the examiner indicated entry of the Reply. The amendments to claims 17 and 23 corrected minor informalities.

All previously filed amendments have been entered.

(v.) Summary of Claimed Subject Matter

Claim 1

Appellant's claim 1 is directed to a container that supplies a source of fuel to a direct methanol fuel cell." [FIG. 1 and Appellant's Specification Page 4, lines 16-19]

Inventive features of Appellant's claim 1 include a housing, the housing having at least a portion of a wall of the housing being comprised of a thermally conductive material. ***"In some embodiments of the fuel cartridge 12 the walls or at least portions of a wall, e.g., 12a of the fuel cartridge 12 are fabricated from a thermally conductive material, typically a metal. Such***

an embodiment of a fuel cartridge 12 uses the walls of the fuel cartridge as a heat sink for heat generated by small portable devices like a lap top computers."[1] See also FIG. 8.

Inventive features of Appellant's claim 1 also include a fuel egress port supported by the housing. "***Referring to FIGS. 2A-2C, a fuel cartridge 12 has a fuel delivery interface, that is complementary to the interconnect 16 (FIG. 1), including an egress port 32, as shown.***"[2]

Inventive features of Appellant's claim 1 also include a surface area enhanced planar vaporization membrane residing in the container. "***The fuel cartridge 12 includes vaporization membrane 44 that partitions a liquid phase of the fuel to a vapor phase that can be delivered to an egress 32 of the fuel cartridge 12.***"[3]

Claim 11

Appellant's claim 11 is directed to a fuel cartridge that supplies a source of fuel to a fuel cell. This feature is supported as the analogous feature of claim 1 and "***Although a fuel cartridge is described, other embodiments of a fuel container are included such as a reservoir 13 as shown in FIG 1B.***"[4]

Inventive features of Appellant's claim 11 include a housing, the housing containing and in direct contact with a liquid source of an oxidizable fuel and having at least a portion of a wall of the housing being comprised of a thermally conductive material." This feature is supported as the analogous feature of claim 1.

Inventive features of Appellant's claim 11 also include a fuel egress port supported by the housing with the at least a portion of a wall of the housing sinking heat generated from external components to enhance a delivery rate of the liquid source of oxidizable fuel in a vapor phase to the egress port of the container. See **FIG. 8** and the analogous feature of claim 1. Also, "***Such an embodiment of a fuel cartridge 12 uses the walls of the fuel cartridge as a heat sink for heat generated by small portable devices like a lap top computers. The metal or conductive material or at least those portions of the cartridge comprised of the conductive material are disposed in thermal communication with a heat-dissipating component 19 within the device***

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[1] Appellant's Specification Page 13, lines 9-12.
[2] Id. page 5, lines 8-9.
[3] Id. page 13, lines 7-8.
[4] Id. page 4, lines 25-26.

10. The fuel cartridge is disposed in close proximity to heat dissipating component 19, e.g., a CPU in a laptop, or within an airflow pattern associated with micro fans (not shown) used in some portable power devices."[5]

Claim 16

Claim 16 is directed to a method.

Inventive features of Appellant's claim 16 include disposing a fuel cartridge into a compartment of an electronic device such that a portion of a wall of a housing of the fuel cartridge that is comprised of a thermally conductive material is placed in thermal communication with a heat generating component in the electronic device to enable a vapor phase of the fuel in the housing to egress from the cartridge. See **FIG. 8** and also: "***Such an embodiment of a fuel cartridge 12 uses the walls of the fuel cartridge as a heat sink for heat generated by small portable devices like a lap top computers. The metal or conductive material or at least those portions of the cartridge comprised of the conductive material are disposed in thermal communication with a heat-dissipating component 19 within the device 10. The fuel cartridge is disposed in close proximity to heat dissipating component 19...***."[6] "***The fuel cartridge 12 draws heat away from heat dissipating component 19 .... Heat will be transferred across the thermally conductive wall of the fuel cartridge 12 and will provide a concomitant increase in the pressure of methanol vapor within the cartridge 12 ....***"[7]

(vi.) Grounds of Rejection to be Reviewed on Appeal

1. Claims 11-15 and 24 stand rejected under 35 U.S.C. 102(a) as being anticipated by Deinzer et al (WO 03/043112) using (US 2006/0172171) as an equivalent English translation.

2. Claims 1-10 and 16-22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Lawrence et al (US 2002/0197522) in view of Hirsch et al (US 2004/0209133).

3. Claims 23 and 25 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Deinzer et al (WO 03/043112) using (US 2006/0172171) as an equivalent English

[5] Appellant's specification page 13, line 10-17.
[6] Id.
[7] Id. lines 18-23.

translation as applied to claim 11 above, and further in view of Lawrence et al (US2002/0197522).

4. Claim 26 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Deinzer et al (WO 03/043112) using (US 2006/0172171) as an equivalent English translation as applied to claim 11 above, and further in view of Hirsch et al (US 2004/0209133).

(7) Argument

Anticipation

"It is well settled that anticipation under 35 U.S.C. §102 requires the presence in a single reference of all of the elements of a claimed invention." *Ex parte Chopra*, 229 U.S.P.Q. 230, 231 (BPA&I 1985) and cases cited.

"Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim." *Connell v. Sears, Roebuck & Co.*, 220 U.S.P.Q. 193, 198 (Fed. Cir. 1983).

"This court has repeatedly stated that the defense of lack of novelty (i.e., 'anticipation') can only be established by a single prior art reference which discloses each and every element of the claimed invention." *Structural Rubber Prod. Co. v. Park Rubber Co.*, 223 U.S.P.Q. 1264, 1270 (Fed. Cir. 1984), citing five prior Federal Circuit decisions since 1983 including *Connell.*

In a later analogous case the Court of Appeals for the Federal Circuit again applied this rule in reversing a denial of a motion for judgment n.o.v. after a jury finding that claims were anticipated. *Jamesbury Corp. v. Litton Industrial Prod., Inc.*, 225 U.S.P.Q. 253 (Fed. Cir. 1985).

After quoting from *Connell*, "Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim," 225 U.S.P.Q. at 256, the court observed that the patentee accomplished a constant tight contact in a ball valve by a lip on the seal or ring which interferes with the placement of the ball. The lip protruded into the area where the ball will be placed and was thus deflected after the ball was assembled into the valve. Because of this constant pressure, the patented valve was described as providing a particularly good seal when regulating a low pressure stream. The court quoted with approval

from a 1967 Court of Claims decision adopting the opinion of then Commissioner and later Judge Donald E. Lane:

> [T]he term "engaging the ball" recited in claims 7 and 8 means that the lip contacts the ball with sufficient force to provide a fluid tight seal **** The Saunders flange or lip only sealingly engages the ball 1 on the upstream side when the fluid pressure forces the lip against the ball and never sealingly engages the ball on the downstream side because there is no fluid pressure there to force the lip against the ball. The Saunders sealing ring provides a compression type of seal which depends upon the ball pressing into the material of the ring. *** The seal of Saunders depends primarily on the contact between the ball and the body of the sealing ring, and the flange or lip sealingly contacts the ball on the upstream side when the fluid pressure increases. 225 U.S.P.Q. at 258.

Relying on *Jamesbury*, the ITC said, "Anticipation requires looking at a reference, and comparing the disclosure of the reference with the claims of the patent in suit. A claimed device is anticipated if a single prior art reference discloses all the elements of the claimed invention as arranged in the claim." *In re Certain Floppy Disk Drives and Components Thereof*, 227 U.S.P.Q. 982, 985 (U.S. ITC 1985).

Obviousness

"It is well established that the burden is on the PTO to establish a prima facie showing of obviousness, *In re Fritsch*, 972 F.2d. 1260, 23 U.S.P.Q.2d 1780 (C.C.P.A., 1972)."

In *KSR Intl. Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007), the Supreme Court reversed a decision by the Court of Appeal's for the Federal Circuit decision that reversed a summary judgment of obviousness on the ground that the district court had not adequately identified a motivation to combine two prior art references. The invention was a combination of a prior art repositionable gas pedal, with prior art electronic (rather than mechanical cable) gas pedal position sensing. The Court first rejected the "rigid" teaching suggestion motivation (TSM) requirement applied by the Federal Circuit, since the Court's obviousness decisions had all advocated a "flexible" and "functional" approach that cautioned against "granting a patent based on the combination of elements found in the prior art."

In *KSR* the Supreme Court even while stating that: "the Court of Appeals drew the wrong conclusion from the risk of courts and patent examiners falling prey to hindsight bias," warned that: "a factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning."

> The Court of Appeals, finally, drew the wrong conclusion from the risk of courts and patent examiners falling prey to hindsight bias. A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning. See *Graham*, 383 U. S., at 36 (warning against a "temptation to read into the prior art the teachings of the invention in issue" and instructing courts to "'guard against slipping into the use of hindsight'" (quoting *Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F. 2d 406, 412 (CA6 1964))). Rigid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it.

With respect to the genesis of the TSM requirement, the Court noted that although "As is clear from cases such as Adams[8], a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known."

"The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Gordon*, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

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[8] United States v. Adams, 383 U. S. 39, 40 (1966)

> Although the Commissioner suggests that [the structure in the primary prior art reference] could readily be modified to form the [claimed] structure, "[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Laskowski*, 10 U.S.P.Q. 2d 1397, 1398 (Fed. Cir. 1989).

"The claimed invention must be considered as a whole, and the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination." *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick*, 221 U.S.P.Q. 481, 488 (Fed. Cir. 1984).

> Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under Section 103, teachings of references can be combined only if there is some suggestion or incentive to do so. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984) (emphasis in original, footnotes omitted).

"The critical inquiry is whether 'there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.'" *Fromson v. Advance Offset Plate, Inc.*, 225 U.S.P.Q. 26, 31 (Fed. Cir. 1985).

(1) Claims 11-15 and 24 are allowable over Deinzer et al (WO 03/043112) and 2006/0172171).

Claim 11

For the purposes of this appeal only, claims 11, 12, 15 and 24 stand or fall together. Appellant's claim 11 is representative of this group of claims.

Claim 11 is directed to a fuel cartridge that supplies fuel to a fuel cell. The fuel cartridge includes "a housing ... containing and in direct contact with a liquid source of an oxidizable fuel and having at least a portion of a wall of the housing being comprised of a thermally conductive material." Claim 11 also includes the feature of "a fuel egress port supported by the housing,"

Claim 11 is neither described nor suggested by Deinzer et al. Specifically, Deinzer et al fails to suggest the combination of "housing ... containing and in direct contact with a liquid source ..." and "having at least a portion of a wall of the housing being comprised of a thermally conductive material."

Appellant's claim 11 is directed to a container for a fuel cell that uses the conductive wall portion of the housing to sink heat generated from external components and thus enhance a delivery rate of the liquid source of oxidizable fuel in a vapor phase to the egress port of the container, as generally expressed in claim 11.

The examiner argues that Deinzer et al identically describes these features and specifically argues that:

> **The Deinzer reference discloses a fuel cartridge " 1 " comprising a housing containing and in direct contact with methanol and having at least a portion of a wall "lb" that is disposed adjacent the fuel egress port "la" of the cartridge that is comprised of metal; a fuel egress port "la" supported by the housing; and remaining walls "312" of the cartridge that are made of elastomer which is thermally insulating (See paragraphs [0064],[0067],[0072] and Figure 3).**
>
> **Examiner's note: The inner sleeve "312" is construed as being part of the wall of the housing. The limitation "sinking heat generated from external components to enhance a delivery rate of methanol in a vapor phase to the egress port of the container" is construed as intended use. Therefore, this limitation is not given patentable weight. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.**

Appellant contends that the examiner acknowledges the discrepancy in the teachings of Deinzer, as applied to Appellant's claim 11, because the examiner must construe the teachings of Deinzer in a manner that is contrary to the intended operation of Deinzer. Specifically the examiner's contention that: "**Examiner's note: The inner sleeve "312" is construed as being part of the wall of the housing,**" is in clear contradiction of how Deinzer describes the fuel cartridge and how the inner sleeve 312 functions.

Deinzer discloses a fuel cartridge "1." Deinzer mentions that the walls of the housing can be either metal or plastic, and indeed expresses a preference for metal for certain applications. However, Deinzer also describes for all of the embodiments, that the cartridge has a sleeve 312 and/or 314; 412 and/or 414; 512; 612; 712 and/or 714 that surrounds the methanol. Accordingly, the structure of Deinzer does not anticipate claim 11, because Deinzer cannot meet the features

of "a housing, the housing containing and in direct contact with a liquid source of an oxidizable fuel" and the feature of: "... with the at least a portion of a wall of the housing sinking heat generated from external components to enhance a delivery rate of the liquid source of oxidizable fuel ... ."

Moreover, the examiner's contention that: "**The limitation "sinking heat generated from external components to enhance a delivery rate of methanol in a vapor phase to the egress port of the container" is construed as intended use. Therefore, this limitation is not given patentable weight.**", is legally deficient. The examiner ignores that the limitation is coupled with the structural differences expressed in claim 11, namely that claim 11 requires the housing containing and in direct contact with a liquid source of fuel and "having at least a portion of a wall of the housing being comprised of a thermally conductive material."

Therefore, the feature in claim 11 that the conductive wall portion of the housing sinks heat generated from external components is not a mere intended use, but rather is a functional limitation on the housing that ties together the specifics of the construction of the housing with the arrangement of fuel, as recited in Claim 11.

As construed by the examiner, Deinzer would not inherently be capable of sinking heat. At the very least, Deinzer would not perform this function as well as the claimed structure at least because Deinzer does not expressly describe "having at least a portion of a wall of the housing being comprised of a thermally conductive material." In Deinzer use of thermally conductive materials in any configuration is a best a mere option. Moreover, this option is mitigated by Deinzer's teachings to interpose any of the various embodiments of the inner sleeve 312 comprised of a thermally insulating material, as the examiner acknowledged.

Inherently therefore, Deinzer does not possess the functional limitation on the housing of the conductive wall portion of the housing containing and in direct contact with a liquid source of fuel and does not teach to position such a structure adjacent to heat dissipating components. Rather, Deinzer provides an arrangement with the disclosed active techniques to improve volatility of the fuel, which are avoided or at least mitigated by Appellant's claimed arrangement.

Claim 13

Appellant's claim 13 serves to further limit claim 11 by reciting that the "remaining portions of walls of the cartridge are thermally insulating." In contrast, Deinzer teaches:

> **[0070] The type of materials used for the cartridge 1 depends substantially on the chemical properties of the fuel, but also on the fields of application of the fuel cell. An outer housing 1b of metal is mechanically and thermally more stable than a plastic housing. Due to the higher material strength, higher internal pressures can be used. With the same external dimensions a larger internal volume can be obtained. In comparison, plastics have a weight advantage and are more dimensionally stable with regard to moderate external forces.**
>
> **[0071] In particular with methanol as the fuel, it should be noted that most plastics in contrast to metals exhibit a permeability for methanol which cannot be neglected and is sometimes quite high.**
>
> **[0072] When using methanol as the fuel, the outer housings 1b of the described fuel cartridges 1 are therefore produced with preference for the use of metallic materials. Housings completely made of metal as well as the use of composite materials containing metal and/or metal-coated materials can be considered.**

Thus, while Deinzer recognizes that different materials can be used to construct the housing, Deinzer does not describe the combination that "a portion of a wall of the housing being comprised of a thermally conductive material" and "remaining portions of walls of the cartridge are thermally insulating." Deinzer neither describes nor suggests to use a thermally insulating material to construct one wall portion of the housing and to construct the remaining wall portions of a thermally insulating material. This feature is not met by Deinzer's teachings of "**of composite materials containing metal and/or metal-coated materials**" because here Deinzer contemplates composite materials not a composite construction of different walls of the housing as called for by claim 13.

Claim 14

Claim 14 further limits claim 11 and requires that "the at least a portion of a wall of the housing being comprised of a thermally conductive material is a portion of the housing of the cartridge disposed adjacent the fuel egress port of the cartridge." In the advisory action the examiner argues that:

> **The examiner maintains the contention that the portion of the metallic housing disposed adjacent the fuel egress port "1a" is capable of transferring heat generated from external components to enhance the delivery rate of the liquid methanol fuel. It is well known in the art that fuel cartridges are located near heat generating components in portable electronics fuel cell devices. Since the structure of the fuel cartridge is capable of performing the intended use, it meets the claim.**

Claim 14 further limits claim 11, which requires that "the housing containing and in direct contact with a liquid source of an oxidizable fuel." Deinzer does not identically describe this feature. As discussed above, Deinzer does not show an arrangement in which the housing contains and is in direct contact with a liquid source of an oxidizable fuel. In Deinzer the sleeve 312 and/or 314; 412 and/or 414; 512; 612; 712 and/or 714 prevents the housing from being in direct contact with the fuel. Deinzer at best shows the outlet portion of the housing in contract with the fuel, but is silent as to the placement of the fuel cartridge in proximity to heat generating components. Deinzer also does not explicitly instruct one of ordinary skill to construct the outlet portion from thermally conductive material.

These structural differences, which provide the disclosed advantages, only become apparent after reading Appellant's specification and claims and are neither described by nor inherent in Deinzer.

Appellant contends therefore because Deinzer does not identically describe all of the features of these claims arranged as in the various claims that the examiner's rejection is improper and therefore should be reversed.

(2) Claims 1-10 and 16-22 are patentable over Lawrence et al in view of Hirsch et al.

Claims 1-9

For the purposes of this appeal only, claims 1-9 and stand or fall together. Appellant's claim 1 is representative of this group of claims.

Claim 1 is directed to a container that supplies a source of fuel to a direct methanol fuel cell. Claim 1 includes the features of a housing ... having at least a portion of a wall of the housing being comprised of a thermally conductive material, a fuel egress port supported by the housing and a surface area enhanced planar vaporization membrane residing in the container."

The examiner argues that:

> **The Lawrence reference discloses a fuel cartridge "39a" that supplies methanol to a direct methanol fuel cell comprising: a canister "92a" formed of anodized aluminum which is a thermally conductive material; a fuel bladder "86a" that is made of a plastic material which is thermally insulating; an exit port "88a", wherein**

> **at least a portion of the canister is disposed adjacent to the exit port (See paragraphs [0060],[0093],[0094]). It also discloses disposing a fuel cartridge "39" into a compartment of a portable electronic device "32" (See paragraph [0060]). It also discloses portable electronic devices such as computer laptops or notebooks (See paragraph [0064]).**
>
> **Examiner's note: The housing of the fuel cartridge is construed as a two layer structure with one layer that is thermally conducting and the other layer that is thermally insulating. It is inherent that a portable electronic device such as a computer laptop comprises heat generating components. Therefore, since the fuel cartridge is in direct contact with the computer laptop, it would also be in thermal communication with a heat generating component of the portable electronic device because of the close proximity of the components. In addition, it is also inherent that a computer laptop comprises heat dissipating elements such as the CPU. Therefore, the fuel cartridge is disposed adjacent a heat dissipating element of the portable electronic device.**
>
> **However, Lawrence et al does not expressly teach a surface area enhanced planar vaporization membrane residing in the fuel cartridge. The Hirsch reference discloses a removable fuel cartridge that includes a methanol delivery film that is a pervaporation membrane made of polyurethane that causes liquid methanol in the fuel cartridge to undergo a phase change to a vaporous fuel before it is delivered to the anode of the MEA (See paragraphs [0012],[0050],[0070]).**
>
> **Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Lawrence fuel cartridge to include a surface area enhanced planar vaporization membrane residing in the fuel cartridge in order to allow for the use of a high concentration fuel while using passive water management capabilities (See paragraph [0012]).**
>
> **Examiner's note: The Lawrence fuel cartridge as modified by the Hirsch methanol delivery film would inherently permit heat that is generated by the component in the portable electronic device to increase a vapor pressure of the fuel in the housing to cause the fuel to egress from the cartridge as a vapor.**

Neither Lawrence nor Hirsh whether taken separately or in combination describe or suggest claim 1. The examiner principally relies on Lawrence to teach the feature of the container. Specifically, Lawrence teaches:

> **Removable fuel cartridge 39 generally includes an expandable fuel bladder 86, an expandable pressure member 87, and a sealable exit port 88, as shown schematically in FIG. 7. Removable fuel cartridge 39 includes a rigid canister 92 enclosing expandable fuel bladder 86 and the expandable pressure member. The fuel cartridge is dimensioned and configured such that the fuel bladder is capable of holding at least approximately 5 cubic centimeters of methanol, preferably at least approximately 7 cubic centimeters of methanol, and most preferably at least approximately 10 cubic centimeters. In the illustrated embodiment, a pair of spring clips 93 is provided to engage canister 92 with enclosure 66 and hold the canister in place until a user removes canister 92 from the enclosure to refuel fuel cell assembly 31.**

However, Lawrence teaches that 88a, the exit port, is supported on the expandable fuel bladder 86,[9] not the housing, as called for in claim 1. As for item 88 in Figure 3, it does not

[9] See Lawrence Figure 10

appear that Lawrence provides a description of the configuration of that feature. Accordingly only 88a is available to the examiner to teach what is actually disclosed by Lawrence with respect to the exit port.

The examiner is indeed correct that Lawrence does not disclose "a surface area enhanced planar vaporization membrane residing in the container." The examiner uses Hirsh to teach this feature.

According to the examiner, "**The Hirsch reference discloses a removable fuel cartridge that includes a methanol delivery film that is a pervaporation membrane made of polyurethane that causes liquid methanol in the fuel cartridge to undergo a phase change to a vaporous fuel before it is delivered to the anode of the MEA (See paragraphs [0012],[0050],[0070]).** Nothing in Hirsh suggests that the MDF is "surface enhanced."

The examiner does not specifically address how the alleged combination of Lawrence and Hirsh would actually modify Lawrence. Specifically, the examiner argues **Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Lawrence fuel cartridge to include a surface area enhanced planar vaporization membrane residing in the fuel cartridge in order to allow for the use of a high concentration fuel while using passive water management capabilities (See paragraph [0012])**' The proposed combination apparently places Hirsh's "pervaporation membrane into the bladder arrangement of Lawrence. Appellant contends that the examiner has not offered any guidance on how to accomplish this combination and clearly overlooks that use of these two components together is inconsistent.

Appellant's claim 1 includes "a fuel egress port supported by the housing and a surface area enhanced planar vaporization membrane." Hirsh, by contrast, describes and suggests only a shutter mechanism for a cartridge that may include the methanol delivery film, MDF.[10]

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[10] [0050] The fuel delivery regulation assembly of the present invention is shown schematically in the figures now to be described in several alternative locations relative to the other components of the fuel cell system. It should be understood that those fuel cell system components may be fabricated and assembled in a variety of different configurations. For example, the liquid fuel may be contained in a removable, replaceable and/or refillable cartridge. Such a removable cartridge may also include the methanol delivery film, MDF. Alternatively, the fuel delivery regulation assembly itself might be contained within a removable cartridge or a detachable fuel container, or may be separately detachable, as is desired based on a particular system architecture. Or, one component of the fuel delivery regulation assembly of the present invention might be contained within the cartridge, and the corresponding component may be contained within the fuel cell, or in another portion of the fuel cell system that is not in the cartridge. In other applications, the entire fuel cell system, including the components just described, may be fully contained within a singular unit or housing. A fuel cell system in any of these configurations, or combinations thereof, or other configurations are contemplated as being within the scope of the present invention.

Claim 10

Claim 10 includes the feature that the container of claim 1 has "at least a portion of a wall of the housing being comprised of a thermally conductive material sinks heat to enhance a delivery rate of methanol in a vapor phase across the membrane to deliver the vapor at the egress port of the container."

Although the examiner did not address claim 10 explicitly, it is reasonable to assume that the examiner's discussion of the laptop is intended to address claim 10. Here, the examiner's rejection is a clear exercise in *ex post* reasoning as was cautioned against by the Court in *KSR*.

The examiner uses a reference that describes a cartridge not a container, as claimed in claim 10, without offering any basis for the conclusions that "**the fuel cartridge is in direct contact with the computer laptop, it would also be in thermal communication with a heat generating component of the portable electronic device because of the close proximity of the components.**" No combination of Lawrence with Hirsh specifically allude to the inherent desirability of placing the fuel cartridge next to e.g., the CPU, as opposed to other components that may not dissipate appreciable amounts of heat, and indeed neither of the references suggests the sidewall constructions of the main claim.

Merely because the reference discloses a fuel cartridge, does not provide any motivation to suggest the claimed fuel container and the feature "the housing being comprised of a thermally conductive material sinks heat to enhance a delivery rate of methanol in a vapor phase." Sustaining such an argument would doom every patent application to an unsupported while at the same time, uncontestable obviousness rejection because it begs the question, as presented in this case: Why would the person of ordinary skill have made the decision to use the claimed the housing to sink heat and enhance a delivery rate of methanol in a vapor phase, as in claim 1?

Claim16

For the purposes of this appeal only, claims 16-18 and stand or fall together. Appellant's claim 16 is representative of this group of claims.

Claim 16 is directed to a method that includes "disposing a fuel cartridge into a compartment of an electronic device such that a portion of a wall of a housing of the fuel cartridge that is comprised of a thermally conductive material is placed in thermal

communication with a heat generating component in the electronic device to enable a vapor phase of the fuel in the housing to egress from the cartridge."

Claim 16 requires use of a structure that is not described or suggested by any combination of the cited art, as argued above. Claim 16 also requires the positive action of "disposing a fuel cartridge into a compartment of an electronic device such that a portion of a wall of a housing of the fuel cartridge that is comprised of a thermally conductive material is placed in thermal communication with a heat generating component in the electronic device." Nothing in the cited references recognized the desirability of this action, as the examiner had implicitly acknowledged by his resort to concocted constructions of the cited references.

Claim19

Claim 19, limits claim 16, and requires that disposing a fuel cartridge permits heat that is generated by the component in the electronic device to increase a vapor pressure of the fuel in the housing to cause the fuel to egress from the cartridge, as a vapor. The examiner has not shown that this is possible by the construction of the Lawrence and Hirsh references and the alleged combination of the references.

(3) Claims 23 and 25 are patentable over Deinzer et al in view of Lawrence et al.

Claims 23 and 25

For the purposes of this appeal only, claims 23 and 25 stand or fall together. Appellant's claim 23 is representative of this group of claims.

Claim 23 further limits the cartridge of claim 11 and requires that "the fuel cartridge is configured for a specific electronic device, and ... the portion of the wall of the housing of the cartridge is configured to be disposed adjacent a heat dissipating element of the electronic device."

Deinzer however, does not explicitly instruct to construct the outlet portion from a thermally conductive material and does not explicitly instruct to configure the cartridge to dispose it adjacent to heat dissipating components. These structural differences relate to the

disclosed advantages, and again only become apparent after reading Appellant's specification and claims, but are neither described by nor inherent in Deinzer. The examiner stated:

> **However, Deinzer et al does not expressly teach a fuel cartridge that is configured for a specific electronic device wherein the portion of the wall of the housing of the container is configured to be disposed adjacent a heating dissipating element of the electronic device. The Lawrence reference discloses a fuel cartridge "39" that is configured for a portable electronic device "32" such that the housing of the fuel cartridge is disposed adjacent a heating dissipating element of the electronic device (See paragraph [0060] and Figures 1 and 2). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Deinzer fuel cartridge for use in a portable electronic device such that the portion of the wall of the housing of the fuel cartridge is disposed adjacent a heating dissipating element of the electronic device in order to more efficiently utilize the fuel cartridge as a heat sink for a portable electronic device.**

Claims 23 and 25 distinguish over Deinzer for the reasons discussed above. The examiner acknowledges that Deinzer does not suggest that the fuel cartridge of claim 11 is configured for a specific electronic device ... the portion of the wall of the housing ... configured to be disposed adjacent a heating dissipating element of the electronic device. The examiner thus relies on Lawrence [0060] for this teaching. While Lawrence [0060][11] mentions a fuel cell assembly and a cellular telephone, these teachings do not however suggest "... **a fuel cartridge "39" that is configured for a portable electronic device "32" such that the housing of the fuel cartridge is disposed adjacent a heating dissipating element of the electronic device (See paragraph [0060] and Figures 1 and 2).**", as argued by the examiner. Therefore claim 23 and by analogy claim 25 are allowable over the combination of references.

(4) Claim 26 is patentable over Deinzer et al in view of Hirsh et al.

Claim 26 includes the feature that the cartridge includes "a surface area enhanced planar vaporization membrane residing in the cartridge." The examiner acknowledges that "... **Deinzer et**

[11] [0060] A fuel cell assembly 31 for a portable electronic device 32 in accordance with the present invention is shown in FIG. 1. In the illustrated embodiment, the fuel cell assembly is a direct methanol fuel cell assembly and the portable electronic device is a mobile telephone. Methanol is a convenient liquid source of fuel which is easy to handle and is readily contained in a simple plastic enclosure. Methanol is also relatively inexpensive and is presently widely available. One should appreciate that other types of fuel can be used.

al does not expressly teach a surface area enhanced planar vaporization membrane residing in the container." The examiner relies on Hirsch for this feature.

The examiner argues that: "**The Hirsch reference discloses a removable fuel cartridge that includes a methanol delivery film that is a pervaporation membrane made of polyurethane that causes liquid methanol in the fuel cartridge to undergo a phase change to a vaporous fuel before it is delivered to the anode of the MEA (See paragraphs [0012],[0050],[0070]).** The examiner argues that it would be suggested to modify "**the Deinzer fuel cartridge to include a surface area enhanced planar vaporization membrane residing in the fuel cartridge in order to allow for the use of a high concentration fuel while using passive water management capabilities (See paragraph [0012]).**"

Appellant disagrees. Again the examiner neither shows that Hirsh describes the claimed a surface area enhanced planar vaporization membrane residing in the cartridge nor explains how the proposed modification can be accomplished. Recalling that Deinzer discloses that the fuel is in a bag 612[12] or within inner sleeves 312-512, it is contended that the examiner has not shown how "a surface area enhanced planar vaporization membrane" would not be accommodated by the disclosed structures in Deinzer. Moreover, Deinzer discloses alternative arrangements to force fuel from the cartridge that can be accommodated by the sleeves or bags.

Conclusion

Appellant submits that claims 1-26 are allowable over the art of record. Therefore, the examiner erred in rejecting Appellant's claims and should be reversed.

Respectfully submitted,

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[12] Deinzer [0084].

Appendix of Claims

1. A container that supplies a source of fuel to a direct methanol fuel cell, the container comprising:

a housing, the housing having at least a portion of a wall of the housing being comprised of a thermally conductive material;

a fuel egress port supported by the housing; and

a surface area enhanced planar vaporization membrane residing in the container.

2. The container of claim 1 wherein the surface area enhanced planar vaporization membrane is a polymer membrane.

3. The container of claim 1 wherein the at least a portion of a wall of the housing being comprised of a thermally conductive material is comprised of a metal.

4. The container of claim 1 wherein remaining portions of walls of the container are thermally insulating.

5. The container of claim 1 wherein the at least a portion of a wall of the housing being comprised of a thermally conductive material is a portion of the housing of the container disposed adjacent the fuel egress port of the container.

6. The container of claim 1 wherein the container is a fuel cartridge.

7. The container of claim 6 wherein the cartridge contains the source of fuel.

8. The container of claim 1 wherein the source of fuel is methanol.

9. The container of claim 1 wherein container is a fuel reservoir.

10. The container of claim 1 wherein at least a portion of a wall of the housing being comprised of a thermally conductive material sinks heat to enhances a delivery rate of methanol in a vapor phase across the membrane to deliver the vapor at the egress port of the container.

11. A fuel cartridge that supplies a source of fuel to a fuel cell, the fuel cartridge comprising:

a housing, the housing containing and in direct contact with a liquid source of an oxidizable fuel and having at least a portion of a wall of the housing being comprised of a thermally conductive material; and

a fuel egress port supported by the housing with the at least a portion of a wall of the housing sinking heat generated from external components to enhance a delivery rate of the liquid source of oxidizable fuel in a vapor phase to the egress port of the container.

12. The fuel cartridge of claim 11 wherein the liquid is methanol and the fuel cell is a direct methanol fuel cell.

13. The fuel cartridge of claim 11 wherein remaining portions of walls of the cartridge are thermally insulating.

14. The fuel cartridge of claim 11 wherein the at least a portion of a wall of the housing being comprised of a thermally conductive material is a portion of the housing of the cartridge disposed adjacent the fuel egress port of the cartridge.

15. The fuel cartridge of claim 11 wherein the at least a portion of a wall of the housing being comprised of a thermally conductive material is comprised of a metal.

16. A method comprises:

disposing a fuel cartridge into a compartment of an electronic device such that a portion of a wall of a housing of the fuel cartridge that is comprised of a thermally conductive material is

placed in thermal communication with a heat generating component in the electronic device to enable a vapor phase of the fuel in the housing to egress from the cartridge.

17. The method of claim 16 wherein the fuel cartridge contains a source of an oxidizable fuel.

18. The method of claim 17 wherein the oxidizable fuel is methanol.

19. The method of claim 16 wherein disposing a fuel cartridge permits heat that is generated by the component in the electronic device to increase a vapor pressure of the fuel in the housing to cause the fuel to egress from the cartridge, as a vapor.

20. The container of claim 1 wherein the container is configured for a specific electronic device and the portion of the wall of the housing of the container is configured to be disposed adjacent a heating dissipating element of the electronic device.

21. The container of claim 1 wherein the container delivers methanol to the fuel egress port.

22. The container of claim 1 wherein the container is configured for a specific electronic device, the portion of the wall of the housing of the container is configured to be disposed adjacent a heating dissipating element of the electronic device, and the container delivers methanol to the fuel egress port.

23. The cartridge of claim 11 wherein the fuel cartridge is configured for a specific electronic device, and wherein the portion of the wall of the housing of the cartridge is configured to be disposed adjacent a heat dissipating element of the electronic device.

24. The cartridge of claim 11 wherein the fuel cartridge delivers methanol to the fuel egress port.

25. The cartridge of claim 11 wherein the fuel cartridge is configured for a specific electronic device, the portion of the wall of the housing of the fuel cartridge is configured to be disposed adjacent a heating dissipating element of the electronic device, and the fuel cartridge delivers methanol to the fuel egress port.

26. The cartridge of claim 11 further comprising:
a surface area enhanced planar vaporization membrane residing in the cartridge.

Evidence Appendix

None

Related Proceedings Appendix

None